

### DESCRIPTION

Comprising single and multiple output models with 200 watts of continuous output power, the TM200 series is specially designed for medical applications. Auto-ranging input allows them to operate from any line voltage throughout the world without a selector strap. All auxiliary outputs are with magnetic amplifier or linear regulator to keep regulation. The units are constructed on a printed circuit board with a U-bracket for mechanical support and heat sinking. A cover-and-fan assembly can be added during manufacturing.

### FEATURES

- Low safety ground leakage current
- Meet EN 55011 and FCC class B
- Auto-ranging input
- Short-circuit protection with auto-recovery
- Power Fail Detect ( PFD ) signal
- 100% burn-in at full rated load
- Optional cover-and-fan assembly

### INPUT SPECIFICATIONS

<b>Input voltage:</b>	90 to 130 VAC, or 180 to 264 VAC ( auto-ranging )
<b>Input frequency:</b>	47 to 63 Hz
<b>Input current:</b>	4.5A ( rms ) for 115VAC 2.6A ( rms ) for 230VAC
<b>Leakage current:</b>	90 $\mu$ A max. @ 115VAC, 60Hz 150 $\mu$ A max. @ 230VAC, 50Hz

### OUTPUT SPECIFICATIONS

<b>Output voltage/current :</b>	See rating chart
<b>Total output power :</b>	200 watts maximum
<b>Ripple and noise :</b>	2% peak to peak maximum
<b>Oversvoltage protection :</b>	Provided on output #1 only; set at 112 – 132% of its nominal output voltage
<b>Overcurrent protection :</b>	All outputs protected to short circuit conditions
<b>Temperature coefficient :</b>	All outputs $\pm 0.04\%/^{\circ}\text{C}$ maximum
<b>Transient response :</b>	Maximum excursion of 4% or better on all models, recovering to 1% of final value within 500 $\mu$ s after a 25% step load change
<b>PFD signal :</b>	TTL logic high for normal operation and TTL logic low upon loss of input power. This signal appears at least 1 ms prior to +5V output dropping 5% below its nominal value. This signal also provides a minimum delay of 100 ms after +5V is within regulation.

### TM200 SERIES



### Safety Standard Approvals:



UL 2601-1



CSA C22.2 No. 601.1



TÜV EN60601-1

### ENVIRONMENTAL SPECIFICATIONS

<b>Operating temperature:</b>	0°C to +70°C
<b>Storage temperature:</b>	-40°C to +85°C
<b>Relative humidity:</b>	5% to 95% non-condensing
<b>Derating:</b>	Derate from 100% at +50°C linearly to 50% at +70°C
<b>Cooling:</b>	25 CFM forced air, provided on covered version, to be provided for U-bracket version by user

### GENERAL SPECIFICATIONS

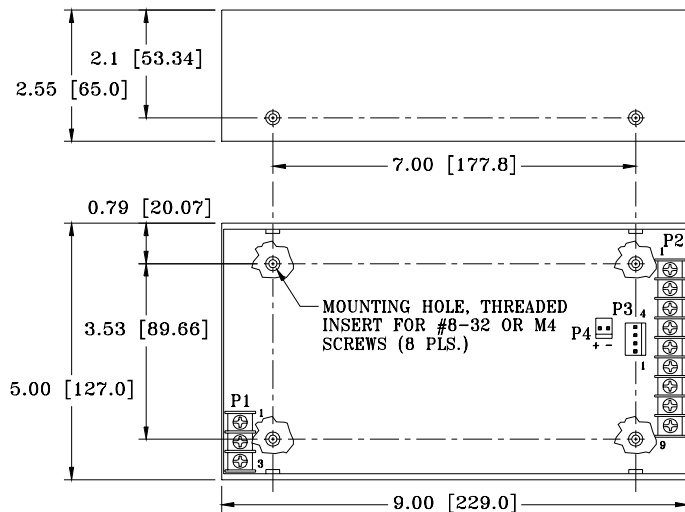
<b>Switching frequency :</b>	64KHz $\pm 5$ KHz
<b>Efficiency :</b>	70% minimum on all models
<b>Hold-up time :</b>	12 msec minimum at 110VAC
<b>Line regulation :</b>	$\pm 0.5\%$ maximum at full load
<b>Inrush current :</b>	20 amps @ 115VAC, or 40 amps @ 230VAC, at 25°C cold start
<b>Withstand voltage :</b>	4000VAC from input to output 1500VAC from input to ground 500VAC from output to ground
<b>MTBF :</b>	450,000 hours at full load at 25°C ambient, calculated per MIL-HDBK-217F
<b>EMC Performance (EN60601-1-2: 2001)</b>	
<b>EN55011:</b>	Class B conducted, Class B radiated
<b>FCC:</b>	Class B conducted, Class B radiated
<b>VCCI:</b>	Class B conducted, Class B radiated
<b>EN61000-3-2:</b>	Harmonic distortion, Class A
<b>EN61000-3-3:</b>	Line flicker
<b>EN61000-4-2:</b>	ESD, $\pm 8$ KV air and $\pm 4$ KV contact
<b>EN61000-4-3:</b>	Radiated immunity, 3V/m
<b>EN61000-4-4:</b>	Fast transient/burst, $\pm 1$ KV
<b>EN61000-4-5:</b>	Surge, $\pm 1$ KV diff, $\pm 2$ KV com.
<b>EN61000-4-6:</b>	Conducted immunity, 3Vrms
<b>EN61000-4-8:</b>	Magnetic field immunity, 1A/m
<b>EN61000-4-11:</b>	Voltage dips, 30% reduction for 500ms and >95% reduction for 10ms interruptions, >95% for 5000ms

## OUTPUT VOLTAGE/CURRENT RATING CHART

Product No.	Output #1				Output #2				Output #3				Output #4				Maximum Output Power
	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Tol.	Vnom.	Imin.	Imax.	Tol.	
TM200-S05	5V	3.0A	40A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-S12	12V	1.2A	16.7A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-S15	15V	1.0A	13.4A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-S24	24V	0.6A	8.4A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-S30	30V	0.5A	6.7A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-S48	48V	0.5A	4.2A	2%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-D23	+5V	3.0A	30A	2%	+12V	0A	8A	4%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-D24	+5V	3.0A	30A	2%	+15V	0A	6A	4%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-D25	+5V	3.0A	30A	2%	+24V	0A	4A	4%	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-T30	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-5V	0A	6A	4%	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-T31	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-12V	0A	4A	4%	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-T32	+5V	3.0A	30A	2%	+15V	0A	6A	4%	-15V	0A	4A	4%	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-T33	+5V	3.0A	30A	2%	+15V	0A	6A	4%	-12V	0A	4A	4%	(N/A)	(N/A)	(N/A)	(N/A)	200W
TM200-Q40	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-12V	0A	4A	4%	5V	0A	6A	4%	200W
TM200-Q41	+5V	3.0A	30A	2%	+15V	0A	6A	4%	-15V	0A	4A	4%	24V	0A	4A	4%	200W
TM200-Q42	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-12V	0A	4A	4%	12V	0A	4A	4%	200W
TM200-Q44	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-15V	0A	4A	4%	15V	0A	4A	4%	200W
TM200-Q45	+5V	3.0A	30A	2%	+12V	0A	8A	4%	-12V	0A	4A	4%	24V	0A	4A	4%	200W

- Notes:
- (1) Add suffix "C" for enclosed format, e.g. TM200-Q45C.
  - (2) Peak current is 12A on +12V, 9A on +15V and 6A on +24V.
  - (3) Output #4 is floating. It can be connected externally for positive or negative output.
  - (4) 200 watts for "C" version with a cover-and-fan assembly. 150 watts U-bracket version without moving air (maximum current of output #1 & #2 derated to 70%), or 200 watts with 25 CFM forced air provided by user.
  - (5) When the remote sense facility is not used, +Sense must be connected to +V, and -Sense to return, on P2 connector.
  - (6) All models may be operated at no-load. At no-load, output voltage tolerance increases to 10%

## MECHANICAL SPECIFICATIONS



### NOTES:

1. Dimensions shown in inch [mm]
2. Tolerance 0.02 [0.5] maximum
3. Input connector P1 is Beau Inc. P/N 72-5-03C, output connector P2 is Beau Inc. P/N 72-5-09C. Screws are #6-32 on 0.375 inch centers.
4. Connector P3 mates with Molex housing 22-01-1043 and Molex 40445 series crimp terminal.
5. Connector P4 mates with Molex housing 22-01-1023 and Molex 40445 series crimp terminal.
6. P4 is for DC fan rated 24V/0.12A (models TM200-S24, -S30, -D25), or 12V/0.2A (other models)
7. Weight:  
1.40 Kgs (3.08Lbs.) approx. for U-bracket version  
1.60 Kgs (3.52 Lbs.) approx. for "C" version

## PIN CHART

Product No.	CON	P1			P2						P3			
		PIN	1	2	3	1, 2	3, 4, 5	6	7	8	9	1	2	3
TM200-S05 TM200-S12 TM200-S15 TM200-S24 TM200-S30 TM200-S48	TM200-S05 TM200-S12 TM200-S15 TM200-S24 TM200-S30 TM200-S48	AC LIVE	AC NEUTRAL	AC GROUND	-SENSE	RET.	OUTPUT #1	OUTPUT #1	OUTPUT #1	+SENSE	FAN	COM. RET.	COM. RET.	PFD
TM200-D23 TM200-D25	TM200-D23 TM200-D25	AC LIVE	AC NEUTRAL	AC GROUND	OUTPUT #1	COM. RET.	OUTPUT #2	N.C.	N.C.	N.C.	FAN	COM. RET.	COM. RET.	PFD
TM200-T30 TM200-T32 TM200-T33	TM200-T30 TM200-T32 TM200-T33	AC LIVE	AC NEUTRAL	AC GROUND	OUTPUT #1	COM. RET.	OUTPUT #2	OUTPUT #3	N.C.	N.C.	FAN	COM. RET.	COM. RET.	PFD
TM200-Q40 TM200-Q42 TM200-Q44 TM200-Q45	TM200-Q40 TM200-Q42 TM200-Q44 TM200-Q45	AC LIVE	AC NEUTRAL	AC GROUND	OUTPUT #1	COM. RET.	OUTPUT #2	OUTPUT #3	OUTPUT #4 RETURN	OUTPUT #4	FAN	COM. RET.	COM. RET.	PFD